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### A KEY TO THE NEW WORLD GENERA OF IASSINAE WITH REVIEWS OF *SCAROIDANA* AND *PACHYOPSIS* (HOMOPTERA: CICADELLIDAE)

By JAMES P. KRAMER<sup>1</sup>

The New World genera of the leafhopper subfamily Iassinae have never been keyed. Oman (1949:43) treated two tribes, Iassini and Gyponini, which he considered as forming the subfamily in the United States. He included, in passing, the Neotropical Krisnini which have since been transferred to the Deltocephalinae by Linnavuori (1959:151). Other and more recent workers than Oman have treated the two remaining tribes as distinct subfamilies, the Iassinae and the Gyponinae. It is with this more recent treatment that I agree.

*Definition of New World Iassinae.* Medium-sized to large leafhoppers (4–13.5 mm.), always robust and stout, frequently somewhat depressed. Face usually short, convex, often tumid, and with lateral frontal sutures terminating at or slightly above antennal pits. Ocelli often small, remote from eyes, and located on extreme anterior margin of crown or on extreme upper portion of face. Area between crown and face not sharply separated, always rounded, never foliaceous. Antennae normal. Crown almost always of uniform width, never sharply produced. Surface of crown and pronotum transversely rugulose. Scutellum always large and well developed. Forewings well-developed, venation often obscure, and with numerous fine setae present (except *Scaroidana*). Color yellowish to brown, rarely, if at all, with striking pattern. Male genitalia normal to highly modified.

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## KEY TO THE NEW WORLD GENERA OF IASSINAE

1. Texture of inner apical cell of forewing distinctly membranous and sharply differing from rest of forewing ..... 2  
 Texture of inner apical cell of forewing the same as the rest of forewing ..... 3
2. Vein separating appendix of forewing from first apical cell evanescent distally, never extending beyond base of second apical cell (Nearctic & Neotropical) ..... *Stragania* Stål  
 Vein separating appendix of forewing from first apical cell not evanescent distally, extending beyond base of second apical cell (Neotropical) ..... *Batrachomorphus* Lewis
3. Forewings without fine setae; length, males 10 mm. or more, females 11 mm. or more (Neotropical) .. *Scaroidana* Osborn  
 Forewings with fine setae; length, males 7 mm. or less, females 9.5 mm. or less ..... 4
4. Setae-bearing punctures of forewings not darkly pigmented; male genital capsule normal (Fig. 19); mesal lobe of style long, blunt apically with a short hook (Fig. 20) (Neotropical and Nearctic) ..... *Pachyopsis* Uhler  
 Setae-bearing punctures of forewings darkly pigmented; male genital capsule retracted into eighth abdominal segment (Fig. 21); mesal lobe of style not as above (Neotropical) 5
5. Setae-bearing punctures sparse and irregularly distributed over forewing; crown, pronotum, and scutellum without dots; pronotum in lateral view normal (Peru and Bolivia) ..... *Grunchia*, n. g.  
 Setae-bearing punctures numerous and uniformly distributed over forewing; crown, pronotum, and scutellum heavily marked with dark brown to black dots; pronotum in lateral view strongly swollen (Mexico) ..... *Gargaropsis* Fowler

*Stragania* Stål

*Stragania* is the largest and probably the best known genus of the New World Iassinae. Beamer and Lawson (1945) revised the Nearctic members and recognized twenty-two species. Linnavuori (1956: 16–21) published a key to the Neotropical members and included twelve species. The Neotropical fauna is undoubtedly much richer than this. Linnavuori (1957: 144–145) reduced *Stragania* to subgeneric rank under *Batrachomorphus*. However, the two genera are easily separated consistently by the character used in the key above.

The species are short and stout, mostly between 3–5 mm., rarely

over 6.25 mm. The forewings are heavily setose. The ground color ranges from yellow or green to brown or reddish with or without contrasting shades. The contrasting shades may be any of the colors already mentioned or black. *Stragania* can be distinguished from all other New World Iassinae by noting that the vein which separates the appendix of the forewing from the first apical cell is evanescent distally.

*Batrachomorphus* Lewis

As far as known, the new species described below appears to be the first example of *Batrachomorphus* in the Americas. I am not familiar with the Old World species but am following Linnavuori's definition of *Batrachomorphus* (Linnavuori 1957: 144).

*Batrachomorphus sialos*, n. sp.

*Length*.—Male 7 mm. Female 8–8.25 mm.

*Coloration*.—Venter including legs and face stramineous to pale brown, all tibiae with minute black dots. Dorsum including forewings brown, ocelli reddish, crown and pronotum densely marked with minute black dots which may be variably fused, forewings at times with a vague dark-reddish or dark-greenish cast, setae-bearing punctures darker. Males darker than females.

*Structure*.—General form very stout, broad, and somewhat depressed. Face short and wide with clypellus small and depressed, antennal pits deep, with their bases covered by sharp, overhanging transverse ledges (Fig. 23). Crown in lateral view very blunt, rather tumid and turned down over face. Crown in dorsal view of uniform width and as wide as pronotum. Scutellum large, surface weakly transversely rugulose, and with anterior angles lightly setose. Forewings setose, thick, opaque, and with punctures distinct. Spinulation of hind femur 2–1–1.

*Male Genitalia*.—Male genital capsule retracted into eighth abdominal segment. Plates absent. Connective membranous and amorphous. In lateral view pygofer with a strong dorsal indentation, a few dorsal setae, aedeagus simple and somewhat V-shaped, styles reduced (Fig. 24). In ventral view aedeagus with a deep apical notch and styles slender (Fig. 25).

*Female Genitalia*.—Pregenital sternum with posterior margin broadly and shallowly indented.

*Types*.—*Holotype* male (USNM Type Number 34877) San Pedro de Montes de Oca, Costa Rica, 19 Aug. 1935, C. H. Ballou, collected on avocado. *Allotype* female and two *paratypes*, one

male and one female, with same data. Five additional paratype females with same data except different collecting dates as follows: three, 24 June 1935; and two, 23 March 1936.

*Discussion.*—This new species conforms reasonably well to Linnavuori's refined definition of *Batrachomorphus* (Linnavuori 1957:144). It differs in spinulation of the hind femur, 2-1-1 versus 2-2-1, and in the male genitalia having the styles reduced and plates entirely absent. These differences are not considered great enough to warrant generic separation, at least at this time.

### *Scaroidana* Osborn

*Scaroidana* contains the largest species found within the subfamily. Because of the strong resemblance to *Gypona* and allied genera, *Scaroidana* was initially placed in the Gyponinae by Osborn (1938:49). This placement was used by Metcalf (1962:55) in his recent catalogue of the Gyponidae (= Gyponinae). However, the following combination of characters clearly indicates relationship to the Iassinae: The ocelli are located on or just below the anterior margin of the crown and are not visible in a dorsal aspect of the head, the crown is narrow and of nearly uniform width, and the general form is not depressed.

*Generic Description.*—Form large and robust. Male with clypellus enlarged and tumid (Fig. 2), female with clypellus normal (Fig. 1). In both sexes the surface of clypeus with dense scaly microsculpturing and upper portion of face transversely rugulose. Pronotum large with lateral margins unusually long. Forewings without setae but roughened, often with shallow inconspicuous punctures especially in claval area. Color yellow to pale brown. Male genitalia with capsule normal, pygofer and plates with macrosetae, setae of plates approximately uniseriate, hair-like setae often present on plates, pygofer with paired internal ventral processes, connective modified Y-shaped, and aedeagus simple. Type-species, *Scaroidana flavida* Osborn.

### KEY TO SPECIES OF SCAROIDANA

1. Color yellow to stramineous; apex of aedeagus in lateral view as high or higher than basal portion (Fig. 5), pygofer process slender (Fig. 3) ..... *flavida* Osborn  
 Color pale brown to yellowish brown; apex of aedeagus in lateral view lower than basal portion (Fig. 7), pygofer process stouter (Fig. 8) ..... 2
2. Apical cells at least partially darker than rest of forewing;

aedeagal shaft in lateral view distinctly narrowed (Fig. 9)  
(South America) ..... *fulvula* Osborn  
Apical cells not darker than rest of forewing; aedeagal shaft  
in lateral view not narrowed (Fig. 7) (Panama) *xouthes*, n. sp.

*Scaroidana flavida* Osborn

*Scaroidana flavida* Osborn, 1938: 50.

*Pachyopsis clypeatus* Linnavuori, 1957: 149, *New Synonymy*.

*Length*.—Male 11–11.5 mm. Female 13–13.5 mm.

*Coloration*.—Yellow to stramineous without darker markings.  
Compound eyes usually reddish.

*Male Genitalia*.—Pygofer process slender and recurved apically (Fig. 3). Style with mesal lobe long, slender, finely serrated on inner margin, and terminating in a sharp point (Fig. 4). Aedeagus stoutest distally with gonopore apparently located ventrally at apex (Fig. 5).

*Female Genitalia*.—Pregenital sternum with posterior margin truncated or very slightly produced at middle (Osborn, 1938: Pl. I, Fig. 4A).

*New Records*.—2 ♂♂ 3♀♀, Chapada, Brazil, Oct. and Nov. (no year) (C. F. Baker); 1 ♀, San Bernardino, Paraguay (K. Fiebrig). All are in the collection of the U. S. National Museum.

*Discussion*.—The South American countries from which *S. flavida* is now known number four; these are Bolivia, Argentina, Brazil, and Paraguay. The species is interpreted here on the basis of the allotype male and one paratype female kindly made available for study by Dr. D. M. DeLong.

*Scaroidana fulvula* Osborn

*Scaroidana fulvula* Osborn, 1938: 51.

*Pachyopsis chulumanensis* Linnavuori, 1957: 148, *New Synonymy*.

*Length*.—Male 10–11 mm. Female 12–12.5 mm.

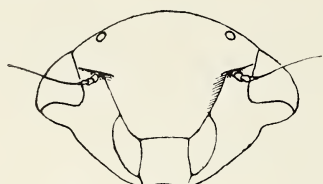
*Coloration*.—Pale brown to yellowish brown with apical cells of forewings at least in part darker. Compound eyes reddish.

*Male Genitalia*.—Pygofer process slender but broadest preapically (Fig. 8). Style like that of *flavida* except extreme apex turned slightly inward. Aedeagus narrowed on distal portion with gonopore located ventrally (Fig. 9).

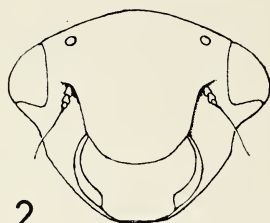
*Female Genitalia*.—Pregenital sternum with posterior margin broadly but slightly produced (Osborn, 1938: Pl. I, Fig. 5A).

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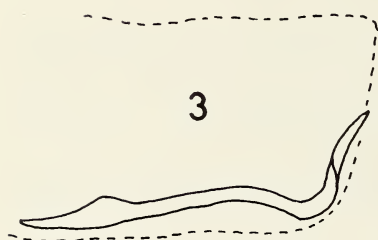
PLATE I



1

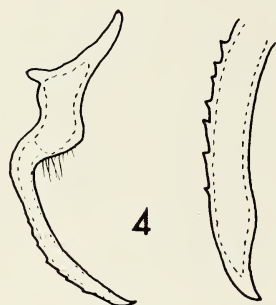


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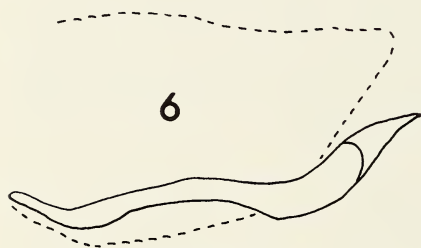


3

flavida

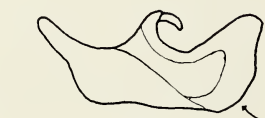


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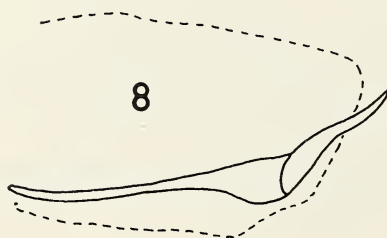
xouthe



5



7



8

fulvula



9



*New Records*: 1 ♂, Huacapistana, Rio Tarma, Peru, 2 June 1930; 1 ♂, Tingo Maria, Peru, Oct., 1949 (H. A. Allard); 1 ♀, Para, Brazil. All are in the collection of the U. S. National Museum.

*Discussion*.—*S. fulvula* is now known from Brazil, Bolivia, and Peru. The species is interpreted here on the basis of the holotype female and allotype male available for study by Dr. D. M. DeLong.

***Scaroidana xouthes*, n. sp.**

*Length*.—Male 10 mm.

*Coloration*.—Pale yellowish brown without darker markings. Compound eyes reddish.

*Male Genitalia*.—Pygofer process similar to that of *flavida* but much stouter (Fig. 6). Style like that of *flavida* except inner margin not finely serrated. Aedeagus uniformly stout with gonopore located ventrally (Fig. 7).

*Female Genitalia*.—Female unknown.

*Type*: Holotype male (USNM Type Number 34878) Trinidad Rio, Panama, 17 March 1912, (A. Busck).

*Discussion*.—*S. xouthes* appears closest to *fulvula* on the basis of color, but the genital structures more closely resemble those of *flavida*. This new Central American species greatly extends the known distribution of the genus.

***Pachyopsis* Uhler**

*Pachyopsis* has long been known from but one Nearctic species, *lactus* Uhler. Three new species from America south of the United States are described below.

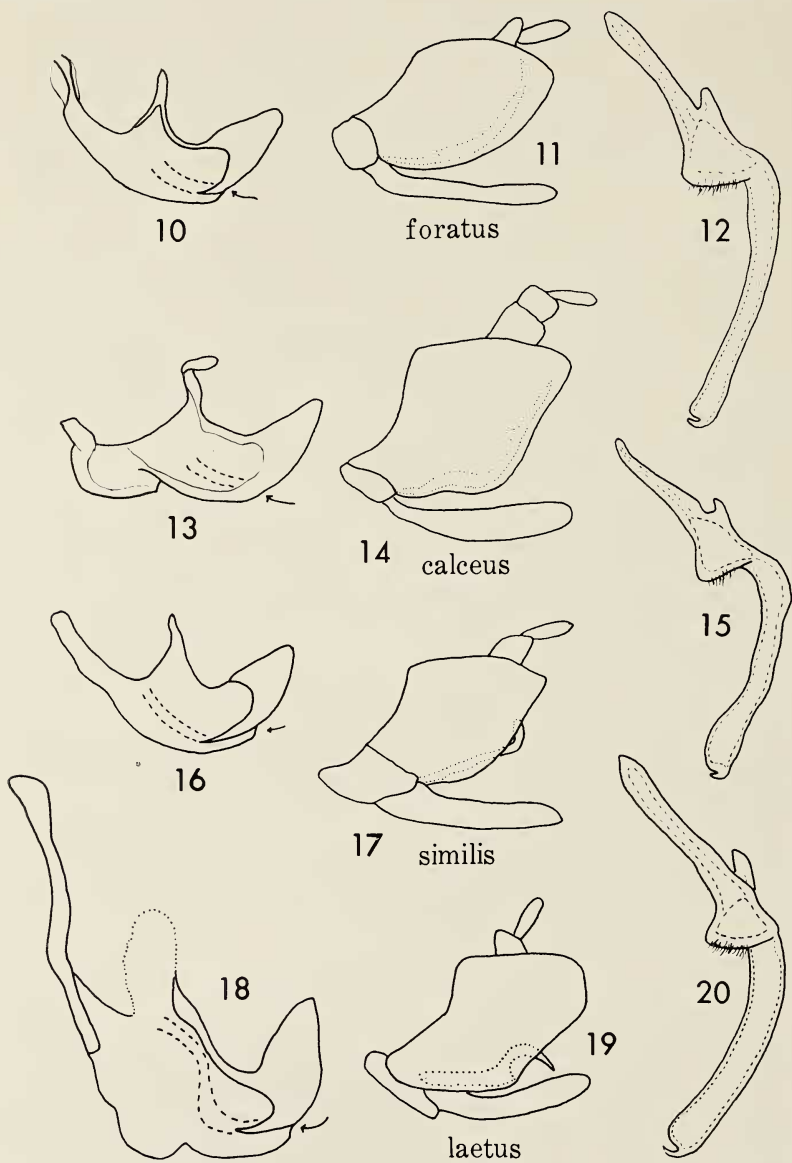
*Generic Description*.—Form robust. Face convex, especially so in males, surface of clypeus finely rugulose. Pronotum large, with lateral margins short. Scutellum often lightly setose. Forewings

EXPLANATION OF PLATE I

*Scaroidana flavida* Osborn: Fig. 1, Face of female; Fig. 2, Face of male; Fig. 3, Lateral view of ventral pygofer process; Fig. 4, Ventral view of style and enlarged stylar apex; Fig. 5, Lateral view of aedeagus. *S. xouthes*, n. sp.: Fig. 6, Lateral view of ventral pygofer process; Fig. 7, Lateral view of aedeagus. *S. fulvula* Osborn: Fig. 8, Lateral view of ventral pygofer process; Fig. 9, Lateral view of aedeagus. Note: Arrows in Figs. 5, 7, and 9 indicate approximate position of gonopore.

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PLATE II





with numerous fine pale setae and at times with extra veinlets in apical portions, setae-bearing punctures not pigmented. Color pale green to brown, rarely pinkish. Male genitalia with capsule normal, pygofer and plates usually with a few macrosetae and hair-like setae, pygofer with paired internal ventral processes, connective strap-like and broadened between styles, mesal lobe of style, long with a short terminal hook (Fig. 20), and with aedeagus stout.

#### KEY TO MALES OF PACHYOPSIS

1. Pygofer process hooked and decurved (Fig. 19); aedeagus with a distinct ventral hump (Fig. 18) (western United States) ..... *laetus* Uhler  
     Pygofer process not hooked and decurved; aedeagus without a distinct ventral hump (Mexico & Neotropical) ..... 2
2. Aedeagus in lateral view with a distinct "heel" (Fig. 13); pygofer process with a proximal blunt tooth-like expansion on recurved portion (Fig. 14) (Ecuador) .... *calceus*, n. sp.  
     Aedeagus in lateral view without a "heel"; pygofer process without an expansion of any sort ..... 3
3. Pygofer process with a right-angle bend in lateral view (Fig. 17); style broadened preapically (Fig. 15); upper portion of face and crown yellowish (Brazil) ..... *similis*, n. sp.  
     Pygofer process smoothly upturned in lateral view (Fig. 11); style not broadened preapically; upper portion of face and crown fuscous (Mexico) ..... *foratus*, n. sp.

#### *Pachyopsis laetus* Uhler

This species was completely redescribed by Oman (1949: 52); he provided excellent illustrations of the crown, thorax, and forewing. He also included synonymy and distributional data, and discussed the male genital structures but did not illustrate them. The distinctive features of the genitalia have already been noted

#### EXPLANATION OF PLATE II

*Pachyopsis foratus*, n. sp.: Fig. 10, Lateral view of aedeagus; Fig. 11, Lateral view of male genital capsule. *P. calceus*, n. sp.: Fig. 12, Broad view of style; Fig. 13, Lateral view of aedeagus; Fig. 14, Lateral view of male genital capsule. *P. similis*, n. sp.: Fig. 15, Broad view of style; Fig. 16, Lateral view of aedeagus; Fig. 17, Lateral view of male genital capsule. *P. laetus* Uhler: Fig. 18, Lateral view of aedeagus and connective; Fig. 19, Lateral view of male genital capsule; Fig. 20, Broad view of style. Note: Arrows in Figs. 10, 13, 16, and 18 indicate approximate position of gonopore.

in the key to males or in the generic description. The ventral hump of the aedeagus is somewhat variable in shape but the form illustrated seems most typical.

***Pachyopsis calceus*, n. sp.**

*Length*.—Male 6.75 mm.

*Coloration*.—Sordid stramineous without distinct darker markings; ocelli reddish.

*Structure*.—A few extra veinlets near apex of forewing.

*Male Genitalia*.—Pygofer with internal process recurved, a blunt proximal toothlike expansion on distal portion (Fig. 14). Aedeagus slipper-shaped with a distinct "heel" (Fig. 13). Style typical of genus (Fig. 12).

*Female Genitalia*.—Female unknown.

*Type*.—*Holotype* male (USNM Type Number 34879) Paute, Ecuador, 11 August 1955 (H. R. Yust), collected on walnut.

*Discussion*.—I have before me three females from Banos, Ecuador, collected in 1937 by W. Clarke-Macintyre. All have the posterior margin of the pregenital sternum indented mesally and rounded laterally, but they appear too large (9–9.5 mm.) to be properly associated with the male.

***Pachyopsis similis*, n. sp.**

*Length*.—Male 5.5–6 mm. Female 6–6.5 mm.

*Coloration*.—Yellowish-brown to pale brown with forewings often somewhat darker than head and thorax; ocelli reddish.

*Male Genitalia*.—Pygofer with internal process sharply upturned distally forming a right angle (Fig. 17). Aedeagus stout, prolonged basally (Fig. 16). Style with mesal lobe slightly expanded preapically (Fig. 15).

*Female Genitalia*.—Posterior margin of pregenital sternum very slightly produced with an ill-defined mesal notch.

*Types*.—*Holotype* male (USNM Type Number 34880), Jusaral, Angra-E. Do Rio, Brazil, 9 November 1934 (Travassos and Lopes). *Allotype* female and five *paratypes*, four males and one female, with same data.

*Discussion*.—*P. similis* and *foratus* are very close but can be separated readily on the basis of the internal pygofer process and coloration as indicated in the key.

***Pachyopsis foratus*, n. sp.**

*Length*.—Male 5.75 mm.

*Coloration*.—Venter including legs and lower portion of face

pale stramineous; upper portion of face and crown dark fuscous; ocelli pale; pronotum, scutellum, and forewings brown, forewings of a lighter shade.

*Male Genitalia*.—Pygofer with internal process gradually recurved and slightly narrowed distally (Fig. 11). Aedeagus stout, prolonged basally (Fig. 10). Style like that of *laetus* (Fig. 20).

*Female Genitalia*.—Female unknown.

*Type*.—*Holotype* male (USNM Type Number 34881), Cuernavaca-Acapulco Road, Mexico, 24 August 1936 (Ball and Stone).

*Discussion*.—This species is distinct on the basis of color and male genital characters. The aedeagus, however, is very much like that of *similis*.

### *Grunchia*, gen. nov.

Type-species, *Batrachomorphus* (*Stragania*) *grossus* Linnavuori.

*Generic Description*.—Form moderately large and robust, similar to *Pachyopsis* but stouter. Clypeus and clypellus tumid, face finely transversely rugulose. Head distinctly narrower than pronotum. Lateral pronotal margins of moderate length. Forewings unusually shiny, transparent, and glassy; setae-bearing punctures rather sparse, darkly pigmented, and scattered; venation obscure except at extreme apex. Male genitalia with capsule retracted into eighth abdominal segment, anal tube and aedeagus simple, and with pseudostyles present.

*Grunchia grossa* (Linnavuori), new combination

*Batrachomorphus* (*Stragania*) *grossus* Linnavuori, 1957: 148.

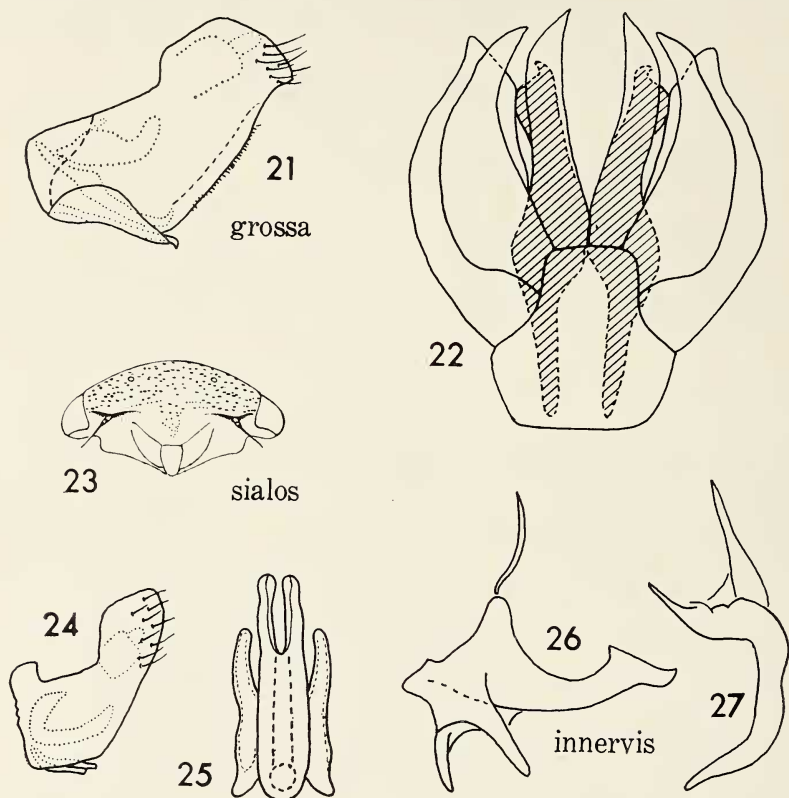
*Length*.—Male 6.5 mm. Female 7–7.5 mm.

*Coloration*.—Ground color light yellowish-brown to sordid yellowish-green. Male with irregular fuscous patches on thoracic venter and on face under antennal bases; clypellus and clypeus, except for a pale area centrally at top, darkly fuscous. Female without such markings. In both sexes ocelli pale; crown, pronotum, and scutellum without definite markings; forewings pale yellowish to golden yellowish with veins mainly concolorous except brownish apically, setae-bearing punctures brown.

*Male Genitalia*.—Genital capsule in lateral view with anal tube simple, pygofer with a few dorsal setae distally and a row of fine short stout setae along ventral margin, aedeagus stoutest basally and upturned distally, style elongated and upturned distally, and pseudostyle exceeding plate with apex downturned (Fig. 21). Connective membranous and amorphous. Genital capsule in ven-

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PLATE III



*Grunchia grossa* (Linnavuori): Fig. 21, Lateral view of male genital capsule; Fig. 22, Ventral view of male genital capsule. *Batrachomorphus sialos*, n. sp.: Fig. 23, Face of female; Fig. 24, Lateral view of male genital capsule; Fig. 25, Ventral view of aedeagus and styles. *Gargaropsis innervis* Fowler: Fig. 26, Lateral view of aedeagus; Fig. 27, Broad view of style.

tral view with styles hooked apically (shaded in drawing), pseudo-styles slender between rather crescent-shaped plates, and with both pygofer and valve well-developed (Fig. 22).

*Female Genitalia*.—Pregenital sternum with posterior margin truncated.

*Records*.—This species was described from three female specimens as follows: Holotype, Callanga, Peru, and two paratypes, Chulumani, Sur-Yungas, Bolivia. All are in European collections. The male is known from a unique Peruvian specimen in the collection of the U. S. National Museum.

*Discussion*.—*Grunchia grossa* (Linnavuori) is readily distinguished by the unusually shiny, transparent, and glassy forewings and the unique features of the male genitalia.

#### *Gargaropsis* Fowler

*Gargaropsis* (Fowler, 1896: 167) was initially described as a genus of the family Membracidae. Although recognized as a cicadellid of the subfamily Iassinae by various authors, *Gargaropsis* has always been listed as a synonym of *Iassus*, *Bythoscopus*, or *Stragania*. In my opinion it is a distinct and valid genus.

The originally included and only species is *innervis* (Fowler, 1896: 167–168) from Xucumanatlan, Guerrero, Mexico. Unfortunately, the only known specimen is the unique type which has been illustrated in color (Fowler, 1896: Tab. 10, Fig. 15). Dr. W. E. China of the British Museum (Natural History) very kindly re-examined the type and made observation and sketches which allowed me to re-evaluate *Gargaropsis*.

*Generic Diagnosis*.—Similar to *Grunchia* but shorter and broader. Upper portion of face tumid. Head narrower than pronotum and appearing small due to greatly swollen pronotum. Forewings vitreous with numerous darkly pigmented setae-bearing punctures; venation moderately distinct. Male genitalia with capsule retracted into eighth abdominal segment; anal tube simple; connective straplike; aedeagus simple with apex somewhat elaborated and dorsal apodeme forked (Fig. 26, drawing inverted), style slender without an apical hook on mesal lobe (Fig. 27).

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## PUBLICATIONS RECEIVED

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**Pesticide Handbook**, ed. by Donald E. H. Freer, 331 pp. College Science Publishers, State College, Penn. 1963. (Price, \$2.50 paperbound, \$3.50 cloth)

**Collembolenfauna Europas**, by Hermann Gisin, 312 pp., 554 figs., *Museum D'Histoire Naturelle*, Geneva. 1960.

**The Beetles of the Pacific Northwest. Part III: Pselaphidae and Diversicornia I**, by Melville H. Hatch, pp. 1-503, 66 pls. *Univ. of Washington Publ. in Biology*, Vol. 16, *Univ. of Washington Press*, Seattle. 1962. (Price \$7.00)

**Robber Flies of the World. The Genera of the Family Asilidae**, by Frank M. Hull, 907 pp., 2,536 figs., in 2 volumes. *Smiths. Inst., U. S. N. M. Bul.* 224. 1962. (Price \$10.25)